


# External forcing

Radiation, temperature, humidity,  
precipitation, disturbance, atmospheric CO<sub>2</sub>.

 = one year

Climatological  
mean forcing

Forcing  
anomaly

## Climatology-induced state changes

**Functional response:** net productivity responses to initial soil moisture, leaf area and root biomass states; heterotrophic responses to initial dead organic mass states.

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**Functional shift:** demographics and species composition changes attributable to post-disturbance recovery, succession, delayed mortality, nutrient limitations and CO<sub>2</sub> fertilization effect.

## Anomaly-induced state changes

**Functional response:** impacts on soil water inputs, photosynthetic uptake, heterotrophic respiration rates and evapotranspiration

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**Functional shift:** Disturbance & mortality impacts on demographics and species composition; shift in ecosystem photosynthetic & transpiration capacity.

## Initial ecosystem states

Plant and soil carbon stocks, water and nutrients, demographics and species composition

## Total ecosystem state changes

## Lagged effects

Ecosystem state changes in the absence of forcing anomaly.

## Concurrent effects

Ecosystem state changes attributable to contemporaneous forcing anomaly.